Aging and Chronic Disease

Menopause Is a Key Factor Influencing Postprandial Metabolism, Metabolic Health and Lifestyle: The ZOE PREDICT Study

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Objectives: The menopause transition is associated with unfavourable alterations in metabolic and cardiovascular health. However, as an age-related biological event, it is difficult to untangle effects of age from menopause. Here, we investigate the impact of menopause on cardiometabolic health, lifestyle and diet in pre- and post-menopausal females and age-matched subgroups (including males) in the densely phenotyped ZOE PREDICT 1 cohort (NCT03479866).

Methods: Demographic information, diet, cardiometabolic blood biomarkers and postprandial responses (lipid and glucose) to standardized test meals in clinic and free-living settings were assessed (n = 1002). Self-reported pre- (n = 366), peri- (n = 55) and post-menopausal (n = 207) females (aged 18–65 y) and an age-matched subgroup (aged 47–56 y) of males (n = 76), pre- (n = 83) and post-menopausal females (n = 64) were identified. Linear regression analysis assessed differences in cardiometabolic health, anthropometry, lifestyle and diet (adjusted for sex, age, BMI, menopausal hormonal treatment and smoking status).

Results: Post-menopausal females had poorer fasting and postprandial blood measures (glucose, HbA1c, inflammation (GlycA), $glucose_{2hiauc}$ and $insulin_{2hiauc}$; by 6, 5, 4, 42 and 4% respectively) and sleep quality (12%) and higher sugar intakes (12%) compared with pre-menopausal females ($p < 0{\cdot}05$ for all). In age-matched females, postprandial glycemia was significantly higher in post- *versus* pre-menopausal females ($p < 0{\cdot}05$), including clinic postprandial glucose peak0-2h ($7{\cdot}6 \pm 1{\cdot}2$ *vs* $7{\cdot}2 \pm 1{\cdot}0$), glycemic variability (using a continuous glucose monitor (CGM)) ($18 \pm 4\%$ *vs* $16 \pm 4\%$) and $glucose_{2hiauc}$ (CGM) following a standardized (typical UK/US nutrient composition) meal (13440 ± 5804 vs 12547 ± 5488). Compared to age-matched males, females (pre- and post-menopausal) had lower systolic blood pressure and ASCVD 10y risk ($p < 0.05$) and post-menopausal females only had worse glycemic variability ($p < 0{\cdot}001$).

Conclusions: In the largest, in-depth nutrition metabolic study of menopause to date, we demonstrate unfavourable links between menopause transition and postprandial glycemic responses, sleep and diet. This emphasises the value of incorporating menopause as a factor in the delivery of nutrition advice.

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